Tabea L.K. Schweden, Uwe Wolfradt, Sara Jahnke, Juergen Hoyer

Depersonalization Under Academic Stress: Frequency, Predictors, and Consequences

Erstveröffentlichung in / First published in:

Psychopathology. 2018, 51 (4), S. 252 – 261 [Zugriff am: 19.05.2020]. Karger. ISSN 1423-033X.

DOI: https://doi.org/10.1159/000489468

Original Paper

Psychopathology

Psychopathology 2018;51:252–261
DOI: 10.1159/000489468

Received: January 5, 2018
Accepted after revision: April 14, 2018
Published online: June 26, 2018

Depersonalization Under Academic Stress: Frequency, Predictors, and Consequences

Tabea L.K. Schweden[a] Uwe Wolfradt[b] Sara Jahnke[a, c] Juergen Hoyer[a]

[a]Institute of Clinical Psychology and Psychotherapy, Technische Universität Dresden, Dresden, Germany; [b]Institute of Psychology, Martin-Luther Universität Halle-Wittenberg, Halle, Germany; [c]Institute of Psychology, Friedrich-Schiller-Universität Jena, Jena, Germany

Keywords
Depersonalization · Test anxiety · Safety behavior · Self-focused attention · Post-event processing

Abstract
Background: Based on the assumptions that depersonalization symptoms are relevant for test anxiety maintenance, we examined their frequency, psychological predictors, association with anxiety symptoms, and association with test performance. ***Sampling and Methods:*** In Study 1, 203 students rated their test anxiety severity and depersonalization in their last oral examination. In Study 2, we assessed test anxiety 1 week before an oral examination, depersonalization, safety behaviors, self-focused attention, and negative appraisals of depersonalization directly after the examination, and post-event processing 1 week later among 67 students. ***Results:*** In Study 1, 47.3% reported at least one moderate depersonalization symptom. In Study 2, test anxiety and negative appraisals of depersonalization significantly predicted depersonalization. Depersonalization was linked to a higher intensity of safety behaviors and post-event processing but not to self-focused attention. It was not related to performance. ***Conclusion:*** Results are limited by the non-random sampling and the small sample size of Study 2. However, by showing that depersonalization contributes to the processes the maintenance of test anxiety, the findings confirm that depersonalization – normally understood as an adaptive mechanism to cope with stressful events – can become maladaptive.

Depersonalization describes the sensation of unreality, detachment, or being an outside observer with respect to one's own feelings and thoughts [1]. It is frequently experienced in several mental disorders, for example, in post-traumatic stress disorder [2], panic disorder [3], borderline personality disorder [4], and in depersonalization/derealization disorder [1]. Even though the research focuses on clinical populations, the experience of depersonalization is not limited to acute states of mental disorders: transient episodes of depersonalization are common in the general population [5, 6], particularly when under social distress [6]. Depersonalization is also known to be associated with more passive forms of coping behavior such as self-blame, resignation, social isolation, and self-compassion [7, 8]. Depersonalization is associated with an underactivity in the autonomic nervous system

KARGER

E-Mail karger@karger.com
www.karger.com/psp

Tabea L.K. Schweden
Technische Universität Dresden
Institut für Klinische Psychologie und Psychotherapie
Hohe Strasse 53, DE–01187 Dresden (Germany)
E-Mail tabea.schweden@tu-dresden.de

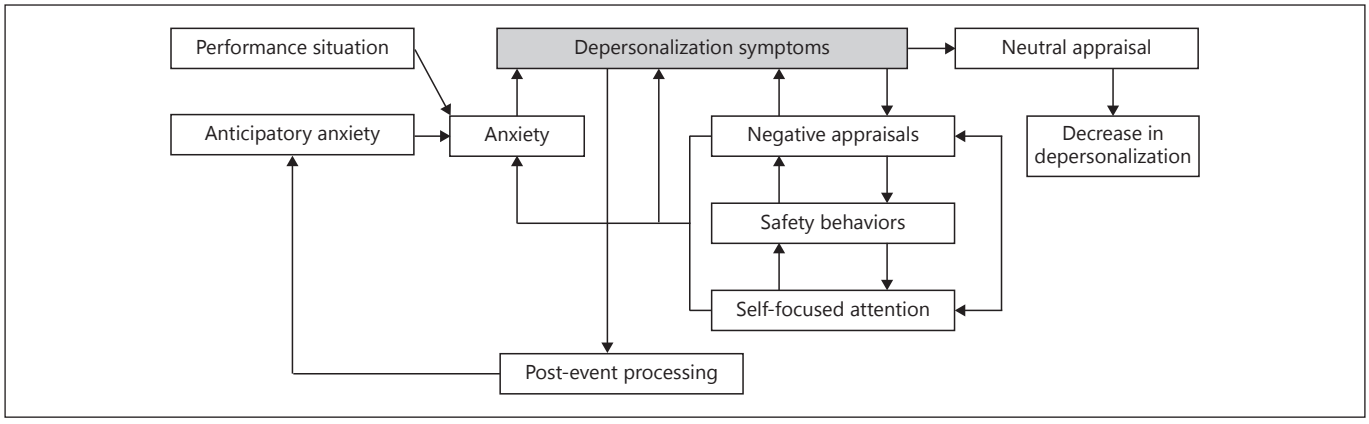

Fig. 1. Cognitive behavioral model of symptoms of depersonalization in performance situations.

and high levels of alertness, which in turn cause that emotional processes are selectively inhibited [9, 10]. Some authors have argued that depersonalization, as a kind of freeze reaction, serves as a functional alternative to the anxiety-related fight-or-flight responses in threatening situations that one cannot escape [11, 12]. In addition, early psychoanalytic authors described the experience of depersonalization as a mechanism of adaption [13, 14]. By dissociating emotions, cognitions, and behavior, it can help individuals to deal with otherwise overwhelming emotional or physical sensations. As examinations are experienced by many, but not all, people as highly threatening and aversive, we argue that students undergoing examinations are likely to experience more or less severe forms of depersonalization. Depersonalization symptoms are likely to be especially strong when the examination involves direct monitoring of performance [15], such as in oral examinations. To date, however, the occurrence of depersonalization has gained less attention in research.

Test anxiety is assumed to be an important condition making an individual vulnerable to feelings of depersonalization [16]. Most of the common definitions describe test anxiety as a persistent and palpable fear and anxiety before, during, and/or after tests [16–18]. Individuals with test anxiety experience bodily symptoms and intense concerns regarding the consequences of poor test performance [16–18]. Test anxiety is highly prevalent in the population: Twenty to thirty-five percent of university and college students, and up to 40% of schoolchildren report impairments due to test anxiety [16, 17, 19]. It can lead to marked distress and (indeed) impair test performance [20, 21]. In the first of the studies presented here, we test the assumption that test anxiety and the frequency of depersonalization symptoms are positively associated.

There is a strong overlap between social anxiety and test anxiety, as the fear to be evaluated negatively by others is the core component of both forms of anxiety (e.g., [22], who also lists some notable differences). The most prominent theories of social anxiety [23–25] state that anxiety is maintained by self-focused attention (attention is shifted inwards), the use of safety behaviors (e.g., keeping still to avoid trembling), and post-event processing (ruminating about an experienced situation). These hypothesized mechanisms contribute to social anxiety disorder, test anxiety, and related social fears (self-focused attention: [26–28]; safety behaviors: [29, 30]; post-event processing: [31, 32]). In order to provide a better understanding of persistent test anxiety, we argue that the experience of depersonalization in examinations should be theoretically integrated into the psychological models of test anxiety. We propose a theoretical model of the maintenance of depersonalization in performance situations based on the cognitive behavioral model of depersonalization/derealization disorder by Hunter et al. [33]. These authors assume that some individuals interpret normal transient symptoms of depersonalization in a catastrophizing manner, meaning an over extreme interpretation of the experience (e.g., as a serious symptom of mental illness), resulting in a vicious cycle of dysfunctional safety strategies, self-focused attention, and negative interpretation biases that maintains the experiences of depersonalization. Empirical studies provide evidence for these assumptions [33–35].

In our model of depersonalization in performance situations (Fig. 1), we assume that academic perfor-

mance situations provoke high levels of stress, especially in individuals with high levels in test anxiety. As depersonalization frequently occurs in stressful or threatening situations [6], we assume the severity of test anxiety to predict the severity of depersonalization during the examination. Symptoms of depersonalization presumably will only increase and lead to negative psychological consequences and thereby become maladaptive, when they are appraised in a negative way (e.g., "It will impair my test performance"; "I won't be able to control the situation"). If the individual interprets the symptom in a neutral or positive way (e.g., "Being 'on autopilot' helps me feel less anxious in the situation"), depersonalization will not further increase the anxiety level. Individuals appraising the experience of depersonalization as unpleasant might wish to counteract this unwelcome state. To appear "normal," they may choose dysfunctional cognitive and behavioral safety strategies (e.g., focusing on a point on the wall or over-intellectualization). Paradoxically, these strategies might *increase* the feeling of being distanced from one's self instead of decreasing them, thereby increasing the severity of depersonalization. In order to monitor unpleasant states of depersonalization, individuals might also focus their attention inwards, which possibly enhances the detection of depersonalization symptoms, which is likely to increase stress levels in people who fear this state of mind. Moreover, possible negative interpretations of depersonalization may increase anxiety along with the likelihood of depersonalization symptoms. Due to the negative effect of depersonalization on memory formation [36], we also expect depersonalization in examinations to impair future recall of the examination situation. This may enhance the negativistic bias in post-event processing (e.g., "Maybe I did something embarrassing that I cannot remember"), which is known to be a crucial factor in the maintenance of anxiety. Therefore, we assume that depersonalization, which originally serves an adaptive function by protecting individuals from overwhelming experiences, begins to lose this function when it has led to negative (social) experiences and/or is interpreted in negative or even catastrophizing self-evaluating manner. It then contributes to *more* test anxiety in the long run through the activation of self-focused attention, post-event processing, and the use of safety behaviors, which are known to be factors in the maintenance of test anxiety. Furthermore, depersonalization may also become maladaptive by impairing test performance [37, 38]. The impairment of the performance quality through the experience of depersonalization is, in our experience, also a typical fear of people experiencing depersonalization in performance situations.

In our first study, we will examine the frequency of depersonalization symptoms in oral examinations and its putative association with test anxiety in a typical ad hoc sample of university students. The second study, a prospective-longitudinal study in a naturalistic setting, was designed to test assumptions from the above presented model also in a typical sample of university students.

Specifically, we tested the following hypotheses in Study 2:

- Depersonalization during the examination is predicted by (a) test anxiety and (b) negative appraisals of depersonalization.
- (a) Safety behaviors, (b) self-focused attention during the examination, and (c) post-event processing 1 week after the examination are predicted by depersonalization during the examination, even when controlling for test anxiety.
- Furthermore, as an exploratory investigation, we analyzed whether in line with the fear of individuals who experience depersonalization during performance situations, these symptoms are negatively related to performance or not.

Study 1

Study 1 was a cross-sectional investigation among university students.

Methods

Participants

An ad hoc sample of $n = 203$ university students from the Technische Universität Dresden (Germany) and the Martin-Luther Universität Halle-Wittenberg participated in the survey (females: 81.77%, $n = 166$). Mean age was 23.78, SD = 3.18, min = 19, max = 48. The mean time since their last oral examination was 21.55 months, SD = 20.79.

Procedure

In 4 different university psychology lectures, all attending students were asked to complete the questionnaires (see below). The study was approved by the local Ethic Committee and all participants gave their written informed consent.

Measures

To measure the intensity of depersonalization experiences during their last oral examination, participants filled out the Cambridge Depersonalisation Scale – Situational (CDS-S; Schweden, Konrad, & Hoyer, unpublished data), which is an adapted version of the Cambridge Depersonalisation Scale (CDS-T: [39]; German version: [40]). For the CDS-S, the original trait scale (CDS-T) was modified to be filled out directly after a situation

that potentially provokes depersonalization. To ask retrospectively for depersonalization in the last oral examination (performed some months before) in this study, the instruction of the CDS-S was slightly modified. The CDS-S includes a modified instruction and some items were slightly reformulated or removed. The remaining 15 items of the CDS-S were answered on a visual analog scale ranging from 0 *(none, never, not at all)* to 100 *(very strong, always)*. A mean score for all items was calculated (range 0–100). For Study 1, the CDS-S items revealed a very good internal consistency, Cronbach's $\alpha = 0.93$. Guttman split half was $r_{tt} = 0.88$.

The severity of test anxiety was measured with the German Test Anxiety Inventory (TAI [Prüfungsangstfragebogen]; [41]). The 4-point answer scale indicates the frequency of test anxiety-related symptoms (e.g., "I tremble with excitement") and thoughts (e.g., "I think of how important a good result is to me") in examinations ranging from 1 *(hardly never)* to 4 *(almost always)*. A total sum score of all 20 items was computed, with higher scores indicating stronger test anxiety (range 20–80).

Statistical Analysis

The CDS-S mean score was logarithmized ($CDS\text{-}S_{log}$) to compensate for strong deviations from normal distribution. Following the approved example of Hoyer et al. [6], we used the CDS-S scale to determine the frequency of mild (defined as 33 or less on a 0–100 scale), moderate (defined as 33–65 on 0–100 scale) and severe symptoms (defined as 66 or more on 0–100 scale) of depersonalization. The relationship between test anxiety and depersonalization was explored with Pearson correlations.

Results

As expected, depersonalization was very common among the examined students: nearly half of the participants experienced at least one moderate symptom of depersonalization in their last oral examination, measured with the CDS-S, M = 9.48, SD = 10.64, (note that interpersonal variance was high). More specifically, 28.6% (n = 58) participants reported at least one moderate symptom of depersonalization and 18.7% (n = 38) participants reported at least one severe symptom of depersonalization. Conversely, 52.5% (n = 107) participants reported to have experienced none or only mild symptoms of depersonalization in their last oral examination. The symptoms with the highest mean scores were: "Out of the blue, I felt strange, as if I were not real or as if I were cut off from the world" (item 1; M = 20.15, SD = 24.60), "Familiar voices (including my own) did sound remote and unreal" (item 7; M = 19.80, SD = 23.39), and "I had the feeling of not having any thoughts at all, so that when I spoke it felt as if my words were being uttered by an 'automaton'" (item 8; M = 16.53, SD = 23.35). As expected, a significant positive correlation was found between the $CDS\text{-}S_{log}$, M = 1.82, SD = 1.08, and the TAI score, M = 46.18, SD = 5.94, $r = 0.42$, $p < 0.001$, which indicates that students with test anxiety disproportionately report severe symptoms of depersonalization.

Discussion

In Study 1, nearly half of the participants experienced at least one moderate symptom of depersonalization in their last oral test. These results suggest that experiences of depersonalization in academic performance situations are the rule rather than the exception. In our sample, depersonalization was not only common during examinations, it was also associated with test anxiety: the higher the test anxiety (as a trait variable), the more severe the intensity of depersonalization in the examination.

It is of note, however, that our sample consisted only of university students who have already demonstrated their ability to pass examinations successfully. It is unclear whether our results can be replicated in clinical samples or in non-academic samples. Moreover, the study is subject to the inherent limitations of retrospective self-report surveys (e.g., consistency bias: [42, 43]).

Study 2

Study 2 was a prospective longitudinal study in university students.

Methods

Participants

University students who had to pass an oral examination between June and October 2015 were recruited via mailing lists, on campus, and during lectures. To separate anxiety-related depersonalization during examinations from depersonalization due to substance-related disorders, psychotic disorders, dissociative disorders, borderline personality disorder, and post-traumatic stress disorder (which we assume to be attributable to different mechanisms), we excluded participants who reported to have had or currently have one of these diagnoses.

Figure 2 depicts the recruitment process in the form of a flowchart. Sixty-seven participants (female: 76.5%, n = 52), who had a mean age of 23.82 years, SD = 3.14, min = 19, max = 32, were included in our analyses. The majority of participants were students of the Technische Universität Dresden (65.67%, n = 44). Further 28.36% (n = 19) were students of the Martin-Luther Universität Halle-Wittenberg and 7.46% (n = 5) studied at the University of Applied Science (Hochschule für Technik und Wirtschaft) in Dresden. Students of diverse fields participated, inter alia: human or dental medicine, sciences (including psychology), pedagogics, technical studies, and economics.

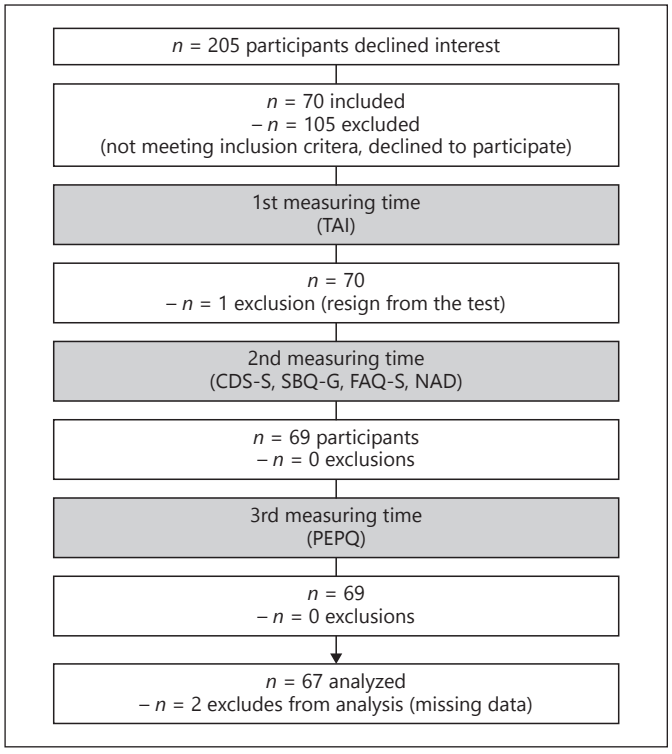

Fig. 2. Flowchart of participants.

We expected students with severe test anxiety to be underrepresented in our self-selected sample because they may prefer preparing for the examination instead of participating in a study where assessments are required a few days prior to the examination. Therefore, we oversampled students with high degrees of test anxiety, striving to achieve a proportion of approximately 35% of students with a high degree of test anxiety (TAI percentile range ≥65), which is equivalent to the proportion of test anxiety in university students [21]. In the TAI, 37.31% (n = 25) participants had a percentile range ≥65. Participation was remunerated with EUR 15 as cash or as a book voucher.

Procedure

Study 2 included 3 stages of measuring (Fig. 2): 1 week before each participant had a regular oral examination, a telephone interview was carried out to ensure candidates met inclusion criteria of the study. Afterwards, each participant completed an online questionnaire assessing trait measures. Within half an hour after the oral examination, a member of the investigator team met the participant on campus, collecting his or her responses on the set of state questionnaires. One week after the oral examination, participants received a link to an online version of a questionnaire (to be filled in within 24 h). They received payment after completing all 3 assessment points. We refrained from consulting participants directly before or even in the oral examination because this might have influenced depersonalization symptoms or interfered with test performance.

Nine participants (13.43%) underwent a group examination and n = 58 (86.57%) were tested individually. All participants rated passing the test as either *very important* (86.57%, n = 58) or *rather important* (13.43%, n = 9).

The local Ethics Committee endorsed the study design prior to participant acquisition and all participants gave their written informed consent.

Measures

Note that Cronbach's α values for all self-rating scales that were used in this study are displayed in Table 1.

Depersonalization Symptoms in the Oral Examination: The severity of depersonalization in the oral examination was measured with the Cambridge Depersonalisation Scale – Situational (see Study 1) directly addressing the examination situation (e.g., item 1: "In the just experienced situation, I felt not real or as if I was cut off from the world").

Potential Predictors of Depersonalization in the Oral Examination: The severity of test anxiety was assessed with the German Test Anxiety Questionnaire (TAI; see Study 1) [41]. To measure how participants evaluate depersonalization symptoms, we developed the Negative Appraisal of Depersonalization Scale (NAD) scale, which had to be filled in directly after the CDS-S. The scale contains 7 negative appraisals of depersonalization, e.g., "I experience the just described perceptions (depersonalization) as disturbing." The participants were asked to rate how much the statements correspond to the way they perceived depersonalization in the examination, using a rating scale from 0 *(do not agree at all)* to 3 *(completely agree)*. We calculated a sum score (range 0–21).

Mechanisms of Anxiety Maintenance: The use of safety behaviors in the test was measured with the German version of the Social Behavior Questionnaire (SBQ-G; original version: unpublished data; German version: [44]). We changed the instruction of the German version of the SBQ-G slightly, so that it refers to the test situation. The 29 items describe physical, mental, and interactional safety behaviors (e.g., to avoid direct eye contact). The items have to be answered on a scale ranging from 1 *(not at all)* to 5 *(very strong)*. As sum score was computed (range 29–145).

To assess the focus of attention during the examination, we translated the self-focused attention subscale of the Focus of Attention Questionnaire (FAQ-S) [45] into German with the support of 2 English native speakers, followed by a conscientious translation/back translation procedure. With regard to an immediately perceived social interaction, the subscale FAQ-S assesses the degree of self-focused attention. For each of the 5 items, participants have to indicate the extent to which they directed their attention inwardly on a 5-point scale ranging from 1 *(not at all)* to 5 *(totally)*. A sum score was calculated (range 5–25). Although Woody et al. [45] reported Cronbach's α = 0.76 for FAQ-S, internal consistency in our study was only α = 0.48 [45].

The degree of post-event processing regarding the oral examination was evaluated 1 week after the examination with the German version of the Post-Event Processing Questionnaire (PEPQ; original version: [46]; German version: [47]). For the purpose of our study, the instruction was modified to refer to the examination situation [6]. The German version consists of 17 items, instead of the 15 items of the original version, which have to be answered on a visual analog scale ranging von 0 *(none, never, not at all)* to 100 *(very strong, always)*. A mean score was conducted (range 0–100).

Table 1. Mean values, SD, minimum, maximum, and Cronbach's α of all self-report measures

	Mean	SD	Min	Max	Cronbach's α
CDS-S (n = 67)	14.31	17.52	0.00	78.00	0.95
CDS-S_{log} (n = 67)	2.09	1.22	0.00	4.37	0.95
TAI (n = 67)	47.67	10.02	27.00	71.00	0.90
NAD (n = 67)	12.52	5.89	7.00	27.00	0.92
NAD_{log} (n = 67)	2.52	0.41	2.08	3.33	0.92
SBQ-G (n = 66)	67.39	12.78	40.00	95.00	0.80
FAQ-S (n = 67)	2.32	0.66	1.00	4.00	0.48
PEPQ (n = 67)	27.28	20.13	6.18	78.53	0.93
$PEPQ_{log}$ (n = 67)	3.09	0.72	1.97	4.38	0.93

CDS-S, Cambridge Depersonalization Scale; CDS-S_{log}, logarithmized CDS-S value; TAI, Test Anxiety Inventory; NAD, Negative Appraisal of Depersonalization Scale; NAD_{log}, logarithmized NAD value; SBQ-G, Safety Behavior Questionnaire; FAQ-S, subscale self-focused attention of the Focus of Attention Questionnaire; PEPQ, Post-Event Processing Questionnaire; $PEPQ_{log}$, logarithmized PEPQ value.

Table 2. Results of Pearson correlations between all self-report measures (2-tailed)

	CDS-S_{log}	TAI	NAD_{log}	SBQ-G	FAQ-S	$PEPQ_{log}$
logCDS (n = 67)	–	0.54**	0.54**	0.58**	0.35**	0.48**
TAI (n = 67)	–	–	0.47**	0.43**	0.52**	0.46**
NAD_{log} (n = 67)	–	–	–	0.52**	0.46**	0.37**
CDS-S_{log} (n = 66)	–	–	–	–	0.60**	0.45**
FAQ-S (n = 67)	–	–	–	–	–	0.32**
$PEPQ_{log}$ (n = 67)	–	–	–	–	–	–
Ex. mark (n = 67)	–	–	–		–	–

** $p < 0.001$. CDS-S_{log}, logarithmized value of the Cambridge Depersonalisation Scale; TAI, test anxiety inventory; NAD_{log}, logarithmized value of the Negative Appraisal of Depersonalization Scale; SBQ-G, Safety Behavior Questionnaire; FAQ-S, subscale self-focused attention of the Focus of Attention Questionnaire; $PEPQ_{log}$, logarithmized value of the Post-Event Processing Questionnaire; ex. mark, examination mark.

Quality of the examination performance: The auditors of the oral examinations marked the test performance with the German university grading system. The lower the examination mark, the better the performance. Passed examinations are graded with examination marks from 1.0 *(very good)* to 4.0 *(sufficient)*. A failed test is graded with a 5.0.

Statistical Analysis

To compensate for strong deviations from the normal distribution, the CDS-S score (CDS-S_{log}), the NAD score (NAD_{log}), and the PEPQ score ($PEPQ_{log}$) were logarithmized. To scrutinize the predictive value of test anxiety (TAI) and the appraisals of depersonalization (NAD_{log}) for the severity of depersonalization in the examination (CDS-S_{log}), we carried out a linear regression with CDS-S_{log} as the dependent variable and NAD_{log} and TAI as the independent variables. To analyze whether depersonalization (CDS-S_{log}) contributes, independently of test anxiety (TAI), to the mechanisms of anxiety maintenance, 3 linear regressions were conducted. For each of the dependent variables (1) safety behaviors (SBQ-G), (2) self-focused attention (FAQ-S), and (3) post-event processing ($PEPQ_{log}$), a linear regression analysis was conducted with TAI and CDS-S_{log} as the independent variables. Furthermore, a correlation analysis was carried out to test the relationship between CDS-S_{log} and the students' academic performance.

Results

Descriptive Statistics

Descriptive results for all self-report measures are listed in Table 1. Two participants failed the test, while 65 passed it, achieving average grades of 1.87, on a grading system of 1 *(very good)* to 4 *(sufficient)*.

Table 3. Multiple linear regression of test anxiety and depersonalization on mechanisms of anxiety maintenance

	SBQ-G (n = 66)			FAQ-S (n = 67)			CDS-S_{log} (n = 67)		
	R^2	β	p	R^2	β	p	R^2	β	p
	0.36		<0.001	0.28		<0.001	0.08		<0.001
TAI		0.17	0.166		0.47	<0.001		0.28	0.027
CDS-S_{log}		0.49	<0.001		0.10	0.409		0.34	0.008

TAI, test anxiety inventory; CDS-S, Cambridge Depersonalisation Scale; CDS-S_{log}, logarithmized value of the Cambridge Depersonalisation Scale; SBQ-G, Safety Behavior Questionnaire; FAQ-S, subscale self-focused attention of the Focus of Attention Questionnaire; $PEPQ_{log}$, logarithmized value of the Post-Event Processing Questionnaire.

Predictors of Depersonalization

Pearson correlations between all self-report measures were all significant (Table 2). A multiple linear regression was carried out to examine whether test anxiety (TAI) and the negative appraisals of depersonalization (NAD_{log}) are predictors of the severity of depersonalization symptoms in the examination (CDS-S_{log}). Both TAI and NAD_{log} were identified as significant predictors of the CDS-S_{log} score, $R^2 = 0.39$, TAI: $\beta = 0.35$, $p = 0.003$, NAD_{log}: $\beta = 0.38$, $p = 0.001$.

Depersonalization and the Mechanisms of Anxiety Maintenance

We conducted linear regressions to test whether depersonalization (CDS-S_{log}) predicts the mechanisms of anxiety maintenance (safety behavior, self-focused attention, and post-event processing). As anxiety is associated with depersonalization as well as with the mentioned mechanisms, we controlled for test anxiety (TAI). The results are presented in Table 3. Depersonalization (CDS-S_{log}) was a significant predictor of safety behavior (SBQ-G) and post-event processing but not of self-focused attention (FAQ-S).

Depersonalization and Performance

The Spearman's correlation between depersonalization in the examination (CDS-S_{log}) and the examination mark did not yield a significant result, $r = -0.06$, $p = 0.639$.

Discussion

In Study 2, we were able to confirm most of our assumptions about the link between potential predictors of depersonalization in examinations and consequences of depersonalization: we found evidence for our hypothesis that test anxiety and negative appraisals of depersonalization 1 week before the examination predict the severity of depersonalization in an examination. Again in accordance with our hypotheses, the severity of depersonalization in the examination contributed to the severity of safety behaviors used in the examination and post-event processing during the week after the examination, even when controlling for test anxiety. However, depersonalization did not predict the severity of self-focused attention and was not associated with a poorer test performance.

To overcome recall and consistency biases, we performed data collection in a naturalistic setting involving a real and personally relevant university oral examination. This is one of the strengths of the current research. However, some methodological limitations of Study 2 need to be considered, such as the small sample size and the non-representative selection of participants. Due to non-random sampling, our findings may not be representative of the general population of students with test anxiety, as only the most competent of those might have enrolled for the study. Further studies are necessary to replicate our results and investigate depersonalization in different types of performance situations. Another limitation is that common method biases could not be ruled out in this study. Possible sources of common method biases are the mood state and the fact that some predictors and criterion variables were measured at the same point of time [48]). To overcome these biases, future studies should control for negative affect and should try to separate measurements of predictors and criteria.

Furthermore, our measure of the severity of self-focused attention showed inadequate internal consistency, which introduces error variance that might have undermined our ability to detect effects related to self-focused attention. Yet, it was the only applicable questionnaire

assessing *state* self-focused attention. More research is needed to design a scale that reliably measures self-focused attention as a state (e.g., by revising items or increasing item number until psychometric requirements are met) and to decide whether the scale's inability to reliably assess self-focused attention in the German sample was due to cultural differences or properties of the tested sample (e.g., high group homogeneity, low anxiety levels overall), or whether it reflects unknown conceptual problems. Moreover, the questionnaire used for measuring safety behaviors screens for safety behaviors strategies that typically occur in social or performance situations but might have overlooked safety behavior strategies that are specific to depersonalization (e.g., to check one is still there). Future studies may benefit from measuring safety behaviors used to control symptoms of depersonalization more precisely.

General Discussion

Although depersonalization has been known to occur during unavoidable stressful events [10], this is the first study to investigate depersonalization in oral examinations and its links to test anxiety. Our findings indicate that symptoms of depersonalization are frequently experienced in academic performance situations.

Additionally, we could largely confirm our model of depersonalization in performance situations: In accordance with our assumptions, we found out that, in addition to test anxiety severity, negative appraisals of depersonalization symptoms may exacerbate depersonalization severity during the examination. Severity of depersonalization contributes (independently from anxiety) to some relevant processes of anxiety maintenance (use of safety behavior and post-event processing; while it did not contribute to self-focused attention). As we could largely confirm our model, we conclude that depersonalization may maintain anxiety (by affecting relevant processes). Therefore, some forms of depersonalization in academic stress situations can be described as maladaptive or dysfunctional.

Our finding that negative appraisals of depersonalization predicts the severity of depersonalization is in line with the finding of the research by Hunter et al. [34]. By showing that patients with depersonalization/derealization disorder (who experience severe episodes of depersonalization) have more negative appraisals of depersonalization symptoms and make less normalizing attributions for these symptoms than healthy controls, they emphasized the importance of appraisal and apprehension processes for the maintenance of depersonalization symptoms. We assume that negative appraisals are the starting point of the vicious cycle of the maintaining of depersonalization in test anxiety.

Our results regarding the use of safety behaviors reveal evidence for our assumption that individuals suffering from depersonalization in oral examinations may wish to counteract or control this unpleasant situation by practicing safety behaviors, such as keeping still or focusing on a point on the wall. Regarding the results of post-event processing, we assume that the perception of depersonalization while performing contributes to the impression of oneself as incompetent. In order to adapt to the unpleasant sensation of depersonalization, ruminating about the situation is likely to occur. Moreover, depersonalization negatively affects the ability to form memories [36].

Our results concerning the relation between depersonalization and self-focused attention were, however, inconclusive: although we found a correlative relationship, we could not confirm our hypothesis of depersonalization being a predictor of self-focused attention. This result is contrary to the findings of an experimental investigation conducted by Hunter et al. [34] who could show that the severity of depersonalization was reduced among patients with depersonalization/derealization disorder when they focused their attention on a cognitively demanding task. Yet, empirical evidence concerning the relationship between depersonalization and measures of attention is overall indecisive. While some authors [36, 37] did not find any significant effect of depersonalization (or dissociation) on the performance in neuropsychological measures of attention, others reported positive associations between (trait) depersonalization and *disturbances* in attentional processes [49]. DePrince and Freyd [50] argued that the experience of dissociation (e.g., depersonalization) interrupts the process of attention focusing, which is known to be an act of self-control [51]. Anxiety reduces the attention toward relevant stimuli at hand (during examinations e.g., the audit questions) by increasing the attention toward irrelevant and anxiety-related stimuli (e.g., increased heart rate) [52]. Perhaps, the effect of depersonalization on attention might be more pronounced regarding its task-related than its self-focused aspects. Future studies are required in order to systematically approach when and which form of attention is being measured.

Finally, we did not detect an association between depersonalization and academic performance (grade). This

finding needs to be emphasized, as it may contradict naive expectations of many individuals undergoing bouts of depersonalization, who potentially may overestimate the negative impact of depersonalization on their performance. Our result is contrary to the prior research results indicating a negative relationship between depersonalization and the quality of performance [37, 38]. However, contrary to these studies that have assessed depersonalization as a trait variable, we measured the severity of depersonalization *within* the performance situation. This methodological difference may contribute to the diverging results. The findings of our study might be useful for the psychoeducation and reducing negative appraisals of depersonalization of people affected by those symptoms in examinations. Symptoms of depersonalization can be both relatively harmless experiences but also indicators of serious mental states, for example, prodromal states of psychosis [53]. For this reason, the specific manifestation of the symptom itself, the combination of symptoms and accompanying clinical characteristics should be taken into account when evaluating these symptoms and when providing psychoeducative information [54].

The main strength of our studies are that we used a combination of approaches – a cross-sectional and a longitudinal study – to scrutinize assumptions deduced from our theoretical model explaining depersonalization in the context of academic stress. However, our results are limited by small sizes of university students, which reduce the external validity of our results. Furthermore, the fact that we could only present selected sample characteristics, restricts the comparability of the results to those of other, namely, clinical studies. It remains to be analyzed in future studies whether our results generalize to pupils and to other types of performance situations (e.g., in competitive sport) [15]. Future studies should scrutinize whether symptoms of depersonalization during examinations are associated with reduced autonomic response as they are in patients with depersonalization-derealization disorder [9]. These objective markers could then be used to overcome limitations of subjective surveys (e.g., consistency bias: [42, 43]).

To reduce test anxiety and to limit negative consequences of test anxiety, there is a need for short and effective psychotherapeutic interventions. Our data argue for an integration of depersonalization treatments into the therapeutic concepts for those individuals with test anxiety who are impacted by depersonalization in examinations. In social anxiety disorder, depersonalization can be significantly reduced through cognitive therapy [55]. Especially clients whose fears are predominantly centered on the consequences of depersonalization may benefit from information about the natural course and function of this phenomenon and correct previously held catastrophic interpretations of this common symptom.

References

1 American Psychiatric Association: Diagnostic and Statistical Manual of Mentaldisorders: DSM-5. Arlington, American Psychiatric Publishing Inc., 2013.
2 Stein DJ, Koenen KC, Friedman MJ, Hill E, McLaughlin KA, Petukhova M, et al: Dissociation in posttraumatic stress disorder: evidence from the world mental health surveys. Biol Psychiatry 2013;73:302–312.
3 Seguí J, Márquez M, García L, Canet J, Salvador-Carulla L, Oritz M: Depersonalization in panic disorder: a clinical study. Compr Psychiatry 2000;41:172–178.
4 Zanarini MC, Frankenburg FR, Jager-Hyman S, Reich DB, Fitzmaurice G: The course of dissociation for patients with borderline personality disorder and axis II comparison subjects: a 10-year follow-up study. Acta Psychiatr Scand 2008;118:291–296.
5 Aderibigbe YA, Bloch RM, Walker WR: Prevalence of depersonalization and derealization experiences in a rural population. Soc Psychiatry Psychiatr Epidemiol 2001;36:63–69.
6 Hoyer J, Braeuer D, Crawcour S, Klumbies E, Kirschbaum C: Depersonalization/derealization during acute social stress in social phobia. J Anxiety Disord 2013;27:178–187.
7 Lichev V, Wolfradt U: Alexithymia and depersonalization in child sex offenders: the role of emotion regulation. Int J of Forensic Mental Health 2016;15:274–282.
8 Wolfradt U, Engelmann S: Depersonalization, fantasies, and coping behavior in clinical context. J Clin Psychol 2003;59:1117–1124.
9 Sierra M, Senior C, Dalton J, McDonough M, Bond A, Phillips ML, O'Dwyer AM, David AS: Autonomic response in depersonalization disorder. Arch Gen Psychiatry 2002;59:833–888.
10 Sierra M, Berrios GE: Depersonalization: neurobiological perspectives. Biol Psychiatry 1998;44:898–908.
11 Ludwig AM: The psychobiological function of dissociation. Am J of Clin Hypn 1983;26:93–99.
12 Scaer RC: The neurophysiology of dissociation and chronic disease. Appl Psychophysiol Biofeedback 2001;26:73–91.
13 Jacobson E: Depersonalization. J Am Psychoanal Assoc 1959;7:581–610.
14 Oberndorf CP: The role of anxiety in depersonalization. Int J Psychoanal 1950;31:1–5.
15 Beilock SL, Carr TH: On the fragility of skilled performance: what governs choking under pressure? J Exp Psychol Gen 2001;130:701–725.
16 Zeidner M: Test Anxiety: The State of the Art. New York, Plenum Press, 1998.
17 Beidel DC, Turner SM: Comorbidity of test anxiety and other anxiety disorders in children. J Abnorm Child Psychol 1988;16:275–287.
18 Brown LA, Forman EM, Herbert JD, Hoffman KL, Yuen EK, Goetter EM: A randomized controlled trial of acceptance-based behavior therapy and cognitive therapy for test anxiety: a pilot study. Behav Modif 2011;35:31–53.
19 McDonald A: The prevalence and effects of test anxiety in school children. Educ Psychol 2001;21:89–101.

20 Eum K, Rice KG: Test anxiety, perfectionism, goal orientation, and academic performance. Anxiety Stress Coping 2011;24:167–178.
21 Talin N, Sansgiry SS: Determinants of academic performance of university students. Pak J Psychol Res 2012;27:265–278.
22 Bögels SM, Alden L, Beidel DC, Clark LA, Pine DS, Stein MB, Voncken M: Social anxiety disorder: questions and answers for the DSM-V. Depress Anxiety 2010;27:168–189.
23 Clark DM, Wells A: A cognitive model of social phobia; in RG Heimberg, M Liebowitz, DA Hope, F Schneier (eds): Social Phobia: Diagnosis, Assessment, and Treatment. New York, Guilford, 1995, pp 69–93.
24 Hofmann SG: Cognitive factors that maintain social anxiety disorder: a comprehensive model and its treatment implication. Cogn Behav Ther 2007;36:193–209.
25 Rapee RM, Heimberg RG: A cognitive-behavioral model of anxiety in social phobia. Behav Res Ther 1997;35:741–756.
26 Bögels SM, Mansell W: Attention processes in the maintenance and treatment of social phobia: hypervigilance, avoidance and self-focused attention. Clin Psychol Rev 2004;24:827–856.
27 Carver CS, Peterson LM, Follansbee DJ, Scheier MF: Effects of self-directed attention on performance and persistence among persons high and low in test anxiety. Cogn Ther Res 1983;7:333–354.
28 Feiler AR, Powell DM: The role of self-focused attention and negative self-thought in interview anxiety: a test of two interventions. Int J Sel Assess 2016;24:132–149.
29 McManus F, Sacadura C, Clark DM: Why social anxiety persists: an experimental investigation of the role of safety behaviours as a maintaining factor. J Behav Ther Exp Psychiatry 2008;39:147–161.
30 Wells A, Clark DM, Salkovskis P, Ludgate J, Hackmann A, Gelder M: Social phobia: the role of in-situation safety behaviors in maintaining anxiety and negative beliefs. Behavior Therapy 1995;26:153–161.
31 Brozovich F, Heimberg RG: An analysis of post-event processing in social anxiety disorder. Clin Psychol Rev 2008;28:891–903.
32 Helbig-Lang S, von Auer M, Neubauer K, Murray E, Gerlach A: Post-event processing in social anxiety disorder after real-life social situations – an ambulatory assessment study. Behavior Research Therapy 2016;84:27–34.
33 Hunter ECM, Philipps ML, Chalder T, Sierra M, David AS: Depersonalisation disorder: a cognitive-behavioural conceptualisation. Behav Res Ther 2003;41:1451–1467.
34 Hunter, ECM, Salkovskis PM, David AS: Attributions, appraisals and attention for symptoms in depersonalisation disorder. Behav Res Ther 2014;53:20–29.
35 Hunter, ECM, Sierra M, David AS: The epidemiology of depersonalisation and derealisation. A systematic review. Soc Psychiatry Psychiatr Epidemiol 2004;39:9–18.
36 Guralnik O, Schmeidler J, Simeon D: Feeling unreal: cognitive processes in depersonalization. Am J Psychiatry 2000;157:103–109.
37 Özdemir O, Özdemir G, Boysan M, Yilmaz E: The relationships between dissociation, attention, and memory dysfunction. Noro Psikiyatr 2015;52:36–41.
38 Pérez-Fabello MJ, Campos A: Dissociative experiences, creative imagination, and artistic production in students of fine arts. Think Skills Creat 2011;6:44–48.
39 Sierra M, Berrios GE: The Cambridge depersonalization scale: a new instrument for the measurement of depersonalization. Psychiatry Res 2000;93:153–164.
40 Michal M, Sann U, Niebecker M, Lazanowsky C, Kernhof K, Aurich S, Overbeck G, Sierra M, Berrios GE: Die erfassung des depersonalisations-derealisations-syndroms mit der deut. Version der Cambridge depersonalisation scale (CDS). Psychother Psychosom Med Psychol 2004;54:367–374.
41 Hodapp V, Rohrmann S, Ringeisen T: Prüfungsangstfragebogen (PAF). Göttingen, Hogrefe, 2011.
42 Leising D: The consistency bias in judgements of one's interpersonal behavior. Two possible sources. J of Individ Differ 2011;32:137–143.
43 Sadler P, Woody E: Is who you are who you're talking to? Interpersonal style and complementarity in mixed-sex interactions. J Pers Soc Psychol 2003;84:80–96.
44 Stangier U, Heidenreich T, Peitz M: Soziale Phobien. Ein kognitiv-verhaltenstherapeutisches Behandlungsmanual. Weinheim, Beltz, 2003.
45 Woody SR, Chambless DL, Glass CR: Self-focused attention in the treatment of social phobia. Behav Res Ther 1996;35:117–129.
46 Rachman S, Grueter-Andrew J, Shafran R: Post-event processing is social anxiety. Behav Res Ther 2000;38:741–756.
47 Fehm L, Hoyer J, Schneider G, Lindemann C, Klusmann U: Assessing post-event processing after social situations: A measure based on the cognitive model for social phobia. Anxiety Stress Coping 2008;21:129–142.
48 Podsakoff PM, MacKenzie SB, Lee JY, Podsakoff NP: Common method biases in behavioral research: A critical review of the literature and recommended remedies. J Appl Psycholo 2003;88:879–903.
49 Freyd JJ, Martorello SR, Alvardo JS, Hayes AE, Christman JC: Cognitive enviroments and dissociative tendencies: performance on the standard Stroop task for high versus low dissociators. Appl Cogn Psychol 1998;12:91–103.
50 DePrince AP, Freyd JJ: Dissociative tendencies, attention, and memory. Psychol Sci 1999;10:449–452.
51 Schmeichel BJ, Baumeister RF: Effortful attention control; in Bruya B (ed): Effortless Attention: A New Perspective in the Cognitive Science of Attention and Action. Cambridge, MIT Press, 2010, pp 29–49.
52 Eysenck MW, Derakshan N, Santos R, Calvo MG: Anxiety and cognitive performance: attentional control theory. Emotions 2007;7:336–353.
53 Klosterkötter J: Indicated prevention of schizophrenia. Dtsch Arztebl Int 2008;105:532–539.
54 Simon AE, Umbricht D, Lang UE, Borgwardt S: Declining transition rates to psychosis: The role of diagnostic spectra and symptom overlap in individuals with attenuated psychosis syndrome. Schizophr Res 2014;159:292–298.
55 Schweden TLK, Pittig A, Braeuer D, Klumbies E, Kirschbaum C, Hoyer J: Reduction of depersonalization during social stress through cognitive therapy for social anxiety disorder: a randomized controlled trial. J Anxiety Disord 2016;43:99–105.